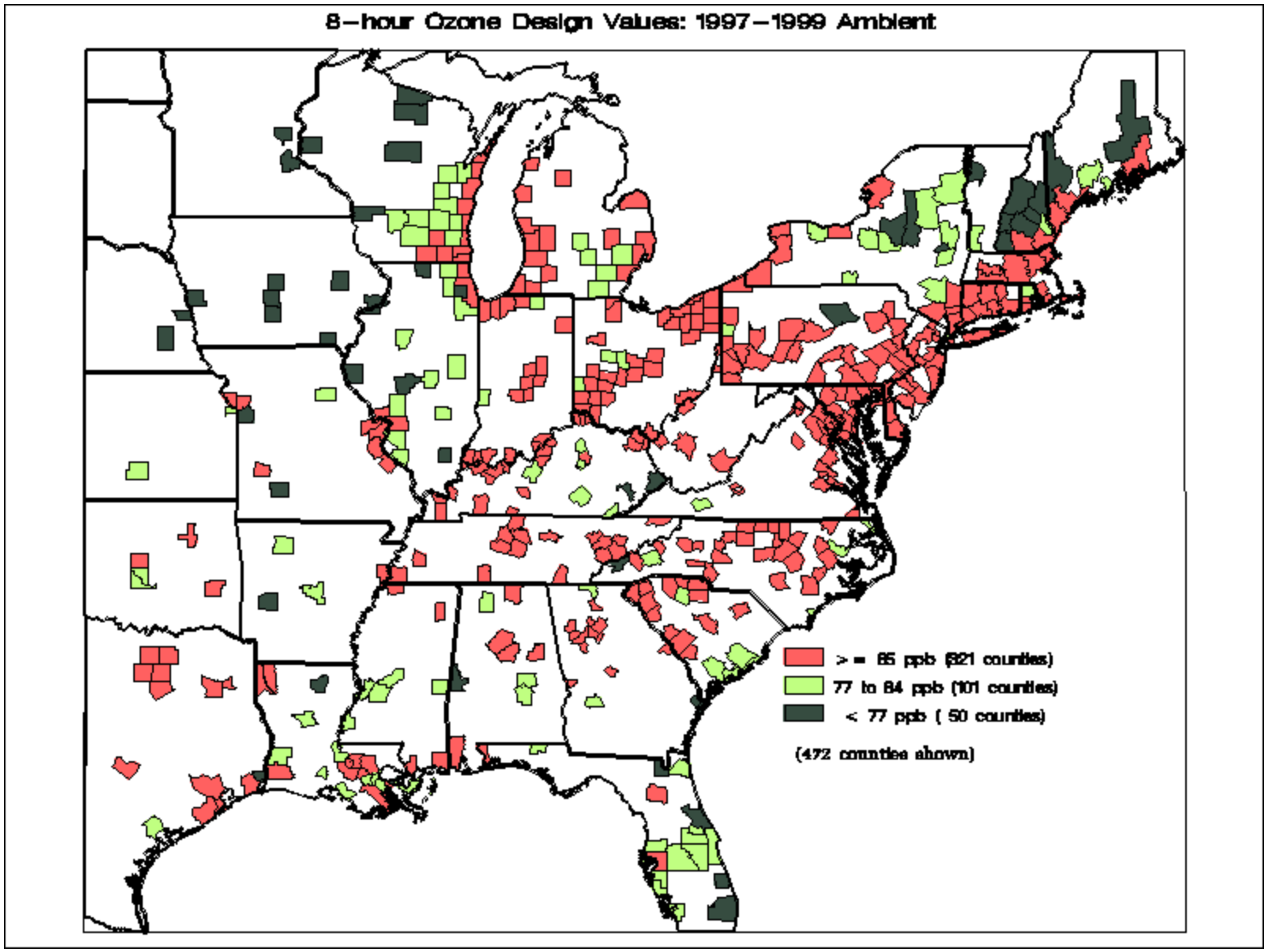
Regional Strategies to Integrate Renewable Energy into State Ozone/Air Quality Planning

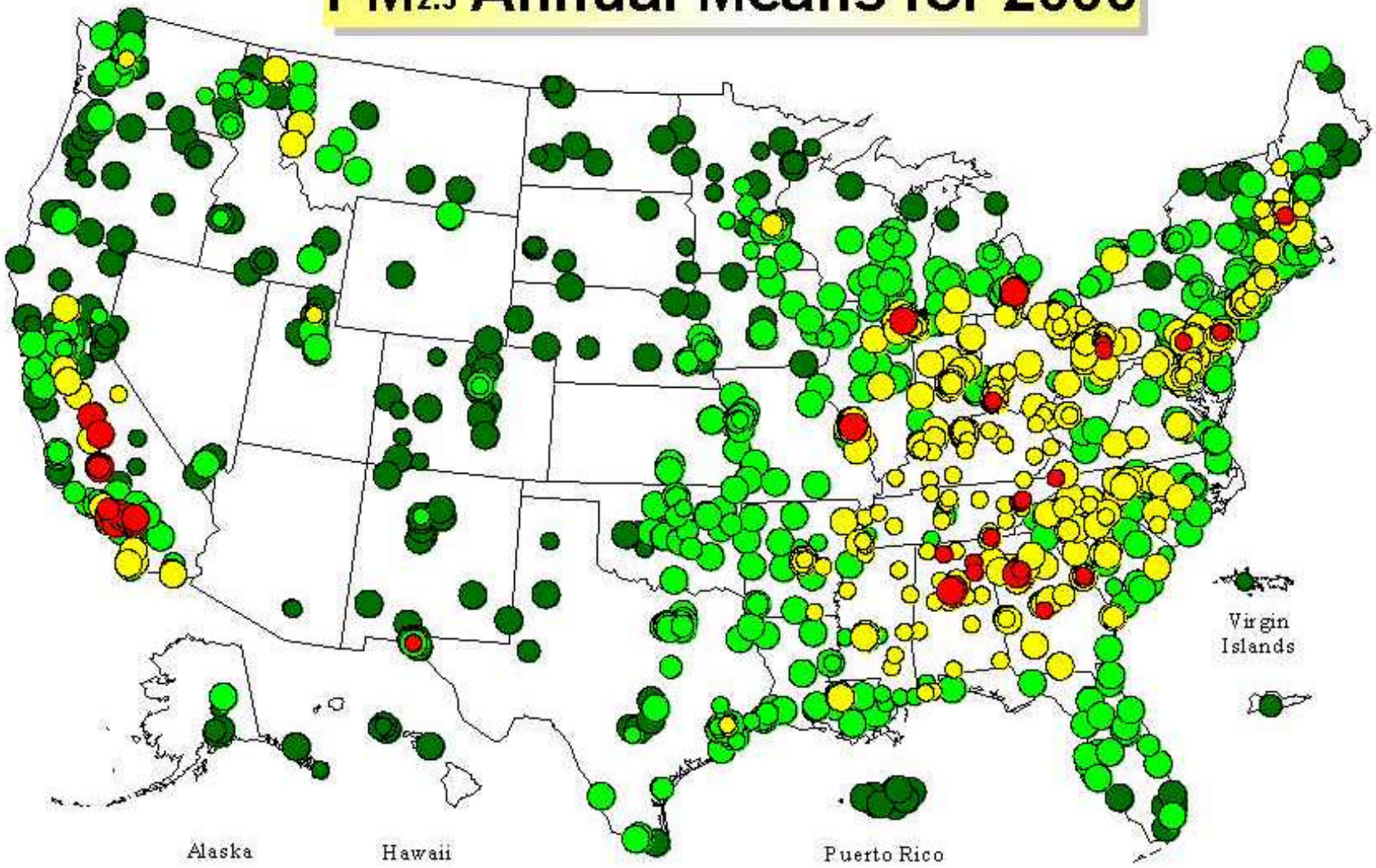
- Chris James, Director, CT DEP Air Quality Planning and Standards, Denver, CO
- 30 May 2002

Overview: Key Points

- ozone is important..but PM2.5, toxics, etc are of equal concern
- focus on value v. cost
- consider renewable like a bond, providing long term price certainty
- energy security, transmission interconnection, power quality, grid stability, reduce business disruption

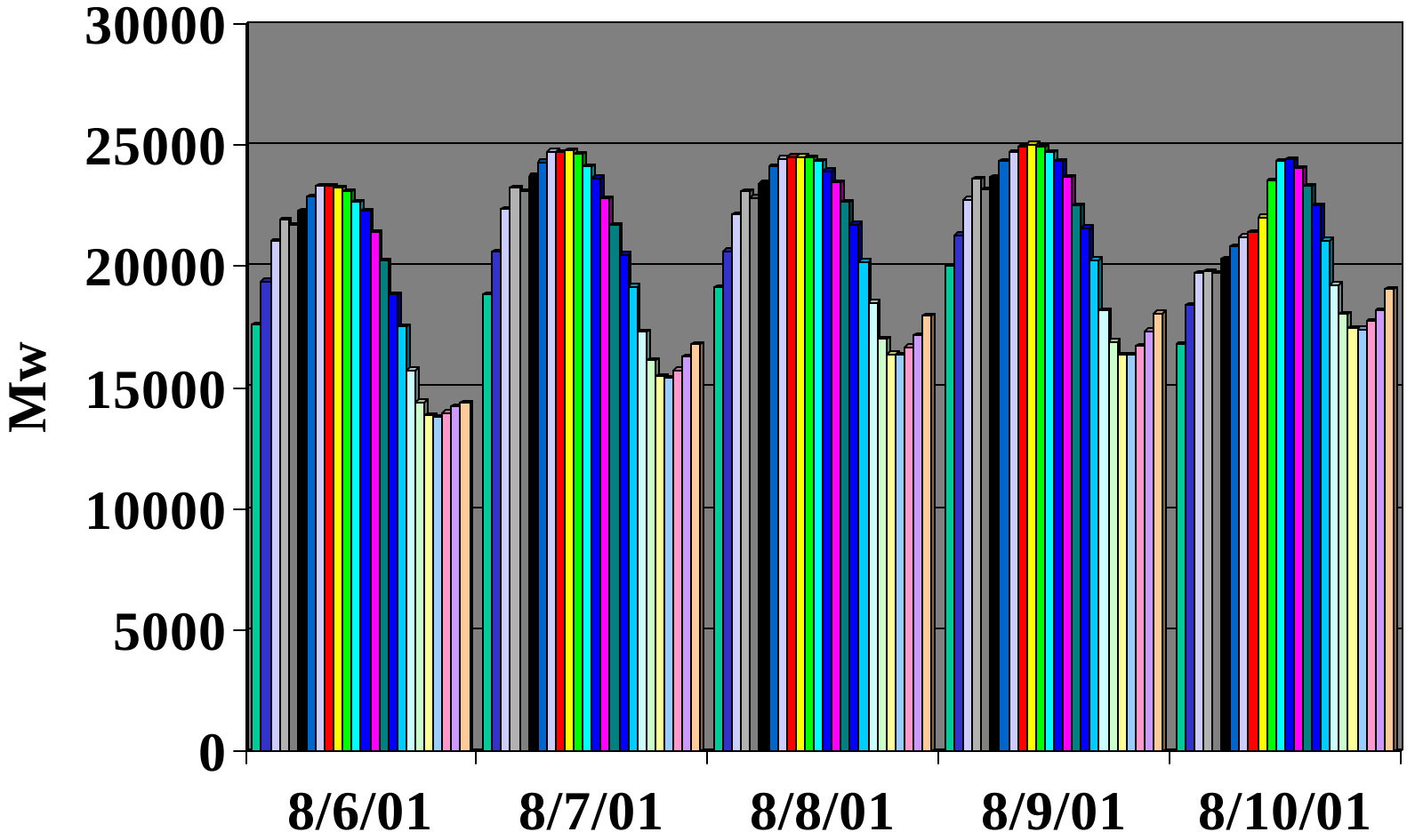

8-hour Ozone Design Values: 1997-1999 Ambient
>= 85 ppb (321 counties)
77 to 84 ppb (101 counties)
< 77 ppb (50 counties)
(472 counties shown)

$PM_{2.5}$ Annual Means for 2000

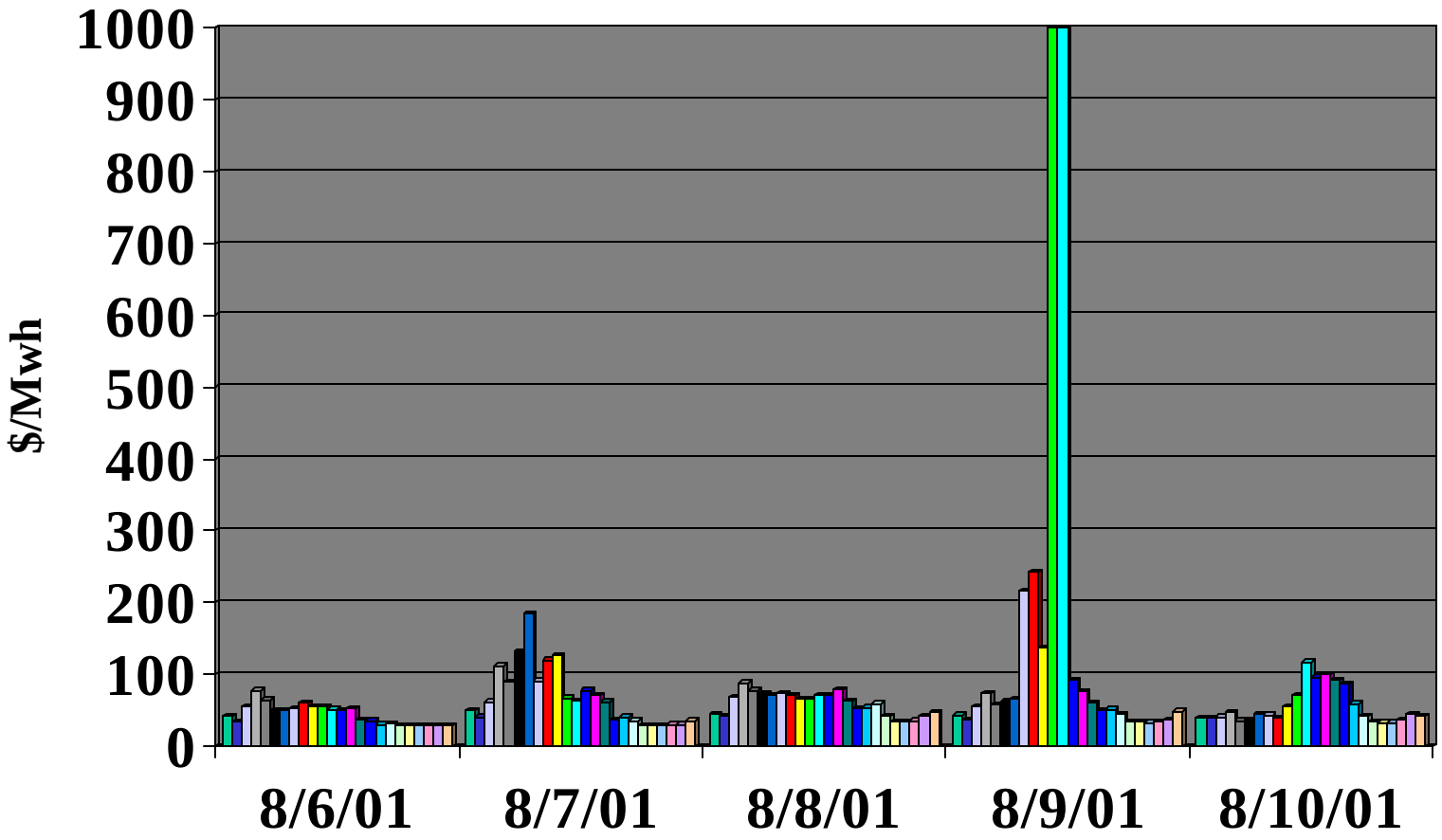


Source: US EPA AIRS Data base as of 7/10/01 without data flagged as 1, 2, 3, 4, T, W, Y, or X

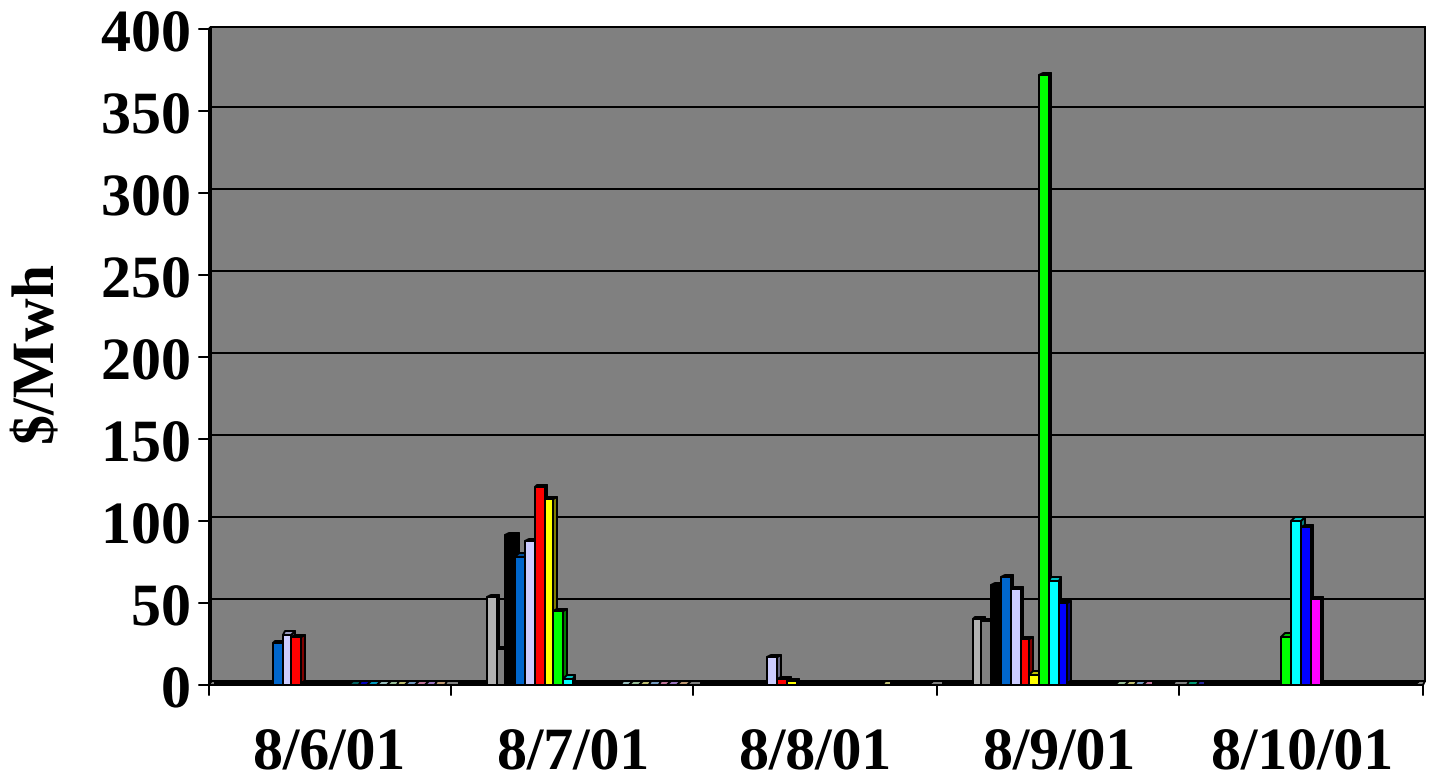
ISO-NE Load

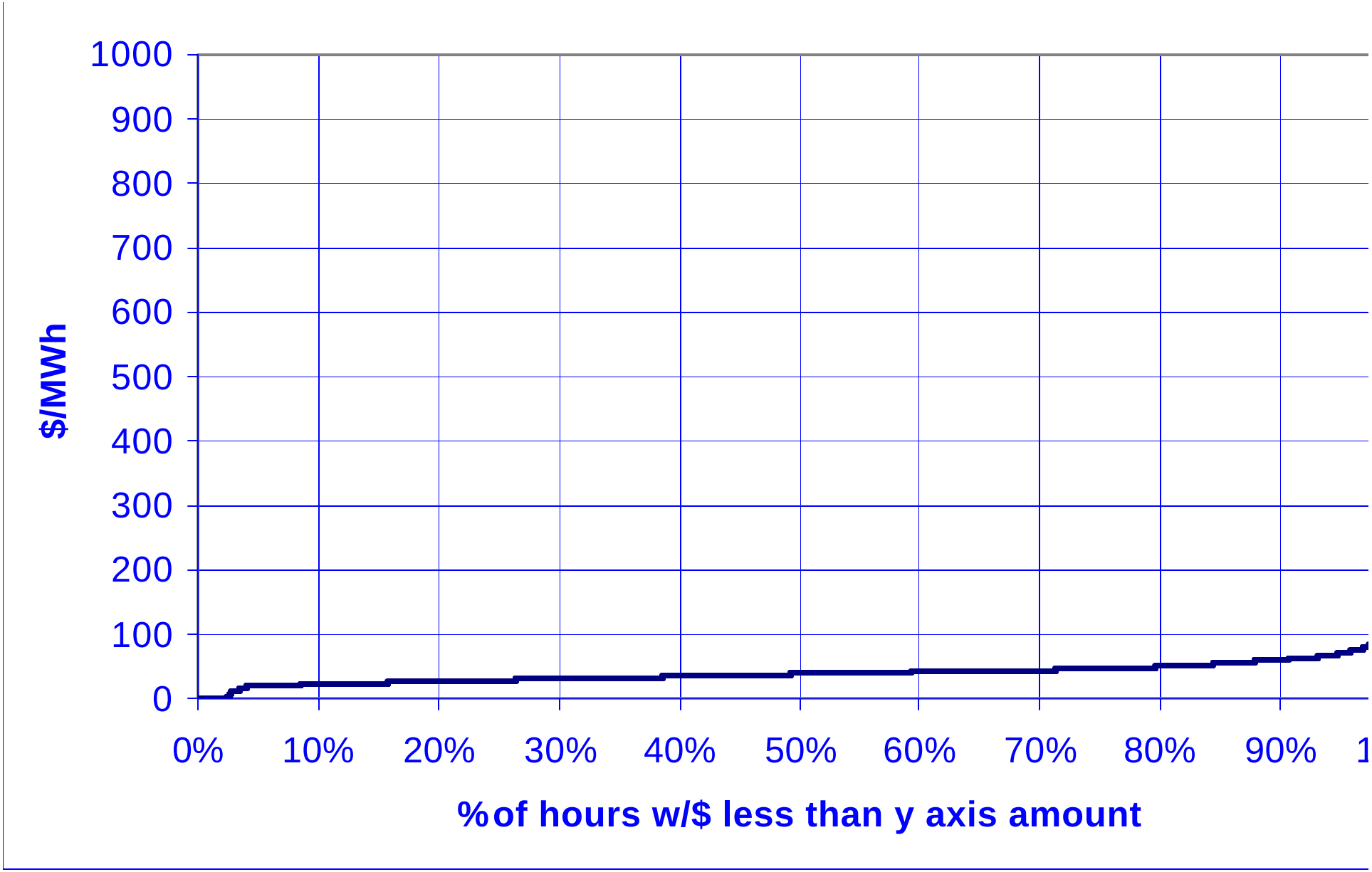

30000
25000
20000
15000
10000
5000
0
Mw
8/6/01
8/7/01
8/8/01
8/9/01
8/10/01

Hourly Bids ISO-NE

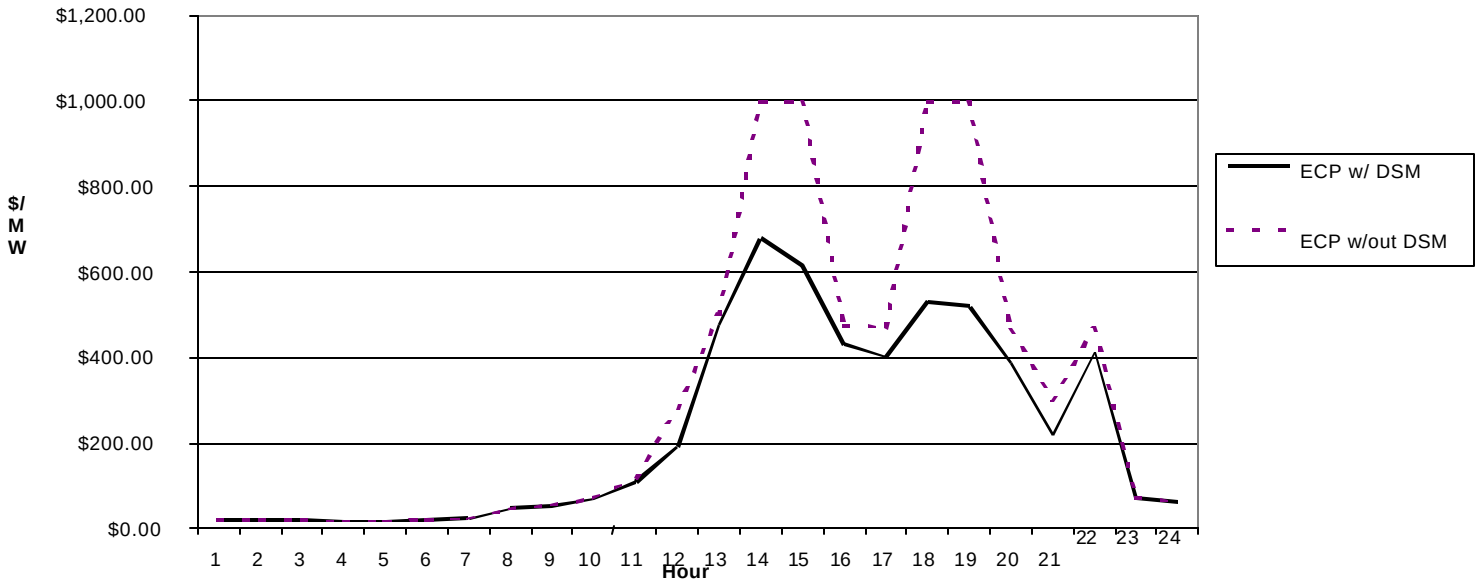


ISO-NE 30-Minute Spinning Reserve




1000
900
800
700
600
500
400
300
200
100
0
$/MWh
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
1
% of hours w/$ less than y axis amount

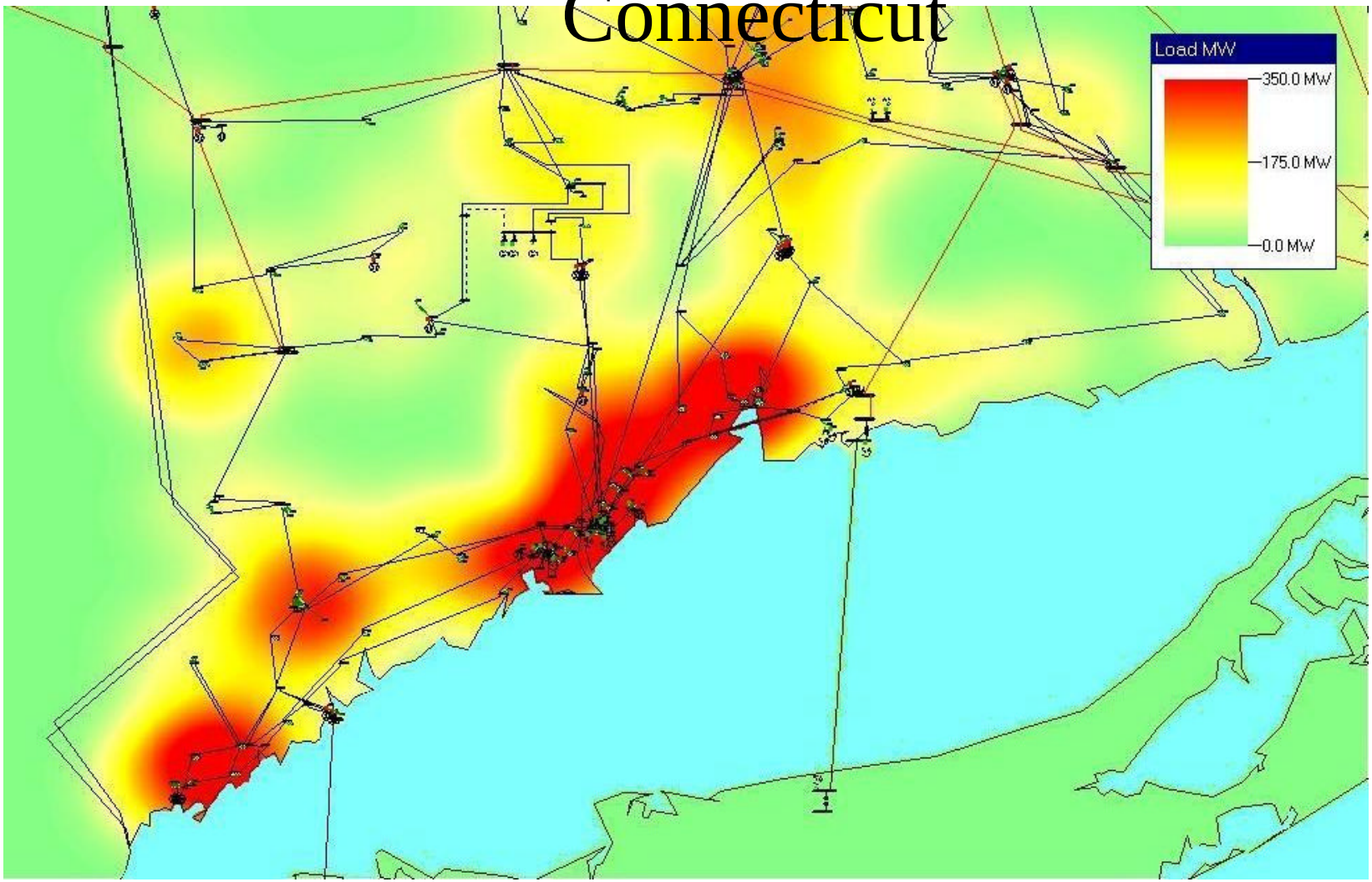
Impact of Energy Efficiency on ISO-NE Spot Market Clearing Price – June 7, 1999



State Actions

- collaborate with PUC et al to target renewable investments: SW CT load pocket
- renewable siting tool to be developed [see next slide]
- metrics: what's being displaced, how to measure

Demand Density - Southwestern Connecticut



Marginal Emissions Rate ISO-NE

2000 Marginal Emission Rates (Lbs./MWh)					
	On-Peak	Off-Peak	On-Peak	Off-Peak	Annual
Emission	Ozone Season	Ozone Season	Non-Ozone Season	Non-Ozone Season	Average
SO_2	6.6	6.0	6.3	5.9	6.2
NO_X	2.0	1.8	1.8	1.8	1.9
CO_2	1,544.7	1,504.7	1,462.8	1,440.1	1,488.1

Calculated CO_2 Marginal Emission Rates (Lbs./MWh)

Year	On-Peak Ozone Season	Off-Peak Ozone Season	On-Peak Non-Ozone Season	Off-Peak Non-Ozone Season	Annual Average
1993	1,630.0	1,610.0	1,580.0	1,750.0	1,642.5
1994	1,767.0	1,334.0	1,796.0	1,396.0	1,573.3
1995	1,654.0	1,458.0	1,713.0	1,511.0	1,584.(
1996	1,696.0	1,575.0	1,752.0	1,590.0	1,653.3
1997	1,437.0	1,522.0	1,487.0	1,488.0	1,483.5
1998	1,621.7	1,431.9	1,537.6	1,490.6	1,520.4
1999	1,643.6	1,549.6	1,586.9	1,530.6	1,577.7
2000	1,544.7	1,504.7	1,462.8	1,440.1	1,488.1

Examples

- PV at truck stops to reduce idling and diesel emissions
- Use of PV to cool transformers, esp. on peak days
- renewable participation in demand response programs
- leverage efficiency and renewable applications

Road Map

- work with insurance/ financial companies: price certainty, improve power quality, avoid business disruption
- energy security improved through distributed resources
- integrate into State air quality planning
- capture economic benefits from reduced uplift and reduced peak prices

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- Thank You!